

### CLAIMS

1. (currently amended) A method of producing crystalline nanoparticles using a continuous flow miniaturised reaction vessel, wherein the reaction vessel comprises at least one inlet, a reaction chamber and at least one outlet, the method comprising:

supplying a continuous reactant flow to the reaction chamber via the inlet;

controlling physical and chemical conditions in the reaction chamber so that reaction occurs to form crystalline nanoparticles of a pre-selected, defined dimension; and

continuously extracting the formed crystalline nanoparticles from the reaction chamber via the outlet.

2. (previously presented) The method of claim 1 wherein the reaction vessel has a reaction volume of from  $1 \times 10^{-5}$  to  $1 \times 10^{-11}$  litres.

3. (cancelled)

4. (previously presented) The method of claim 1 comprising combining an aqueous solution of a cadmium salt and a sulphide salt in the continuous flow miniaturized reaction vessel to produce a plurality of cadmium sulphide nanoparticles.

5. (previously presented) The method of claim 1 wherein a stabiliser is added after the formation of the nanoparticles.

6. (previously presented) The method of claim 1 wherein the nanoparticles produced by the reaction vessel are monodisperse.

7. (previously presented) The method of claim 1 wherein a spatial variation in at least one reaction condition is established within the reaction vessel.

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8. (previously presented) The method of claim 7 wherein at least one reaction condition varied is at least one of reagent concentration, pH, temperature, and intensity of optical illumination provided at varying concentrations.

9. (currently amended) The method of claim 8 wherein the nanoparticles produced are of varying ~~[sizes]~~ defined dimension.

10. (currently amended) A crystalline nanoparticle produced by the method of claim 1.

11. (currently amended) A miniaturised crystalline nanoparticle production device comprising:

at least one inlet,

a reaction chamber that receives a reactant flow sufficient to form crystalline nanoparticles;

~~[and]~~ at least one outlet, and at least one of a temperature varying element that produces a temperature gradient across the reaction chamber so that the formed crystalline nanoparticles are of varying predetermined dimensions, an illumination element that produces an optical illumination intensity gradient across the reaction chamber so that the formed crystalline nanoparticles are of varying predetermined dimensions, and an inlet positioned to provide an off-center continuous reactant flow into the reaction chamber to produce a pH gradient and/or reactant concentration gradient across the reaction chamber so that the formed crystalline nanoparticles are of varying predetermined dimensions,

wherein the device is arranged to allow the continuous reactant flow into the reaction chamber and to allow a continuous flow of formed crystalline nanoparticles out the outlet.

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12.-13. (cancelled)

14. (new) A miniaturised crystalline nanoparticle production device comprising:

a reaction chamber;

a first inlet for supply of at least one reactant adapted to form a crystalline nanoparticulate product to the reaction chamber;

a first outlet for extraction of the crystalline nanoparticulate product from the reaction chamber;

a second outlet for extraction of unreacted or partially reacted reactant from the reaction chamber; and

a second inlet for recycling of the unreacted reactant or partially reacted reactant into the reaction chamber.